

DETAILED ACTION

1. Upon Applicant's request, an interview was held on 05/22/2008 and Applicant was planed to submit an amendment to reflect the agreement reached during the interview. However, in telephone conversation between Examiner and Representative W. Todd Baker on 06/23/2008, Representative confirmed that no amendment as planned was submitted. This Office action is written based on the Applicant's response submitted on 03/26/2008 before the interview held on 05/22/2008.

Specification

2. The amendment on Specification filed 03/26/2008 is objected to under 35 U.S.C. 132(a) because it introduces new matter into the disclosure. 35 U.S.C. 132(a) states that no amendment shall introduce new matter into the disclosure of the invention. The added material which is not supported by the original disclosure is as follows: "or vice versa."

The amendment on Specification filed on 03/26/2008 is not entered.

Election/Restrictions

3. Applicant elected Species III drawn from Fig. 9 without traverse on Response filed on 10/25/2005. The embodiment shown in Fig. 9 only includes a pair of CC layers and one of which should be recognized as the non-magnetic spacer layer.

- Claims 1 recites "wherein each of said at least two CC layer structures is located on a different side of the thin non-magnetic spacer layer, and one of said two CC-layer structures is located within or in contact with said at least one ferromagnetic layer included in said free layer structure and the other CC-layer structure is located within or in contact with said at least one ferromagnetic layer included in said pinned layer structure, wherein none of the CC-layer structures are set in direct contact with said antiferromagnetic layer." Fig. 9 does not show this feature; therefore, claims 1, 3-8, 13-18, 39 and 43 cannot be elected.

- Claim 40 recites “wherein a pair of said at least two CC-layer structures are separated by the thin non-magnetic spacer layer.” Fig. 9 does not show this feature; therefore, claim 40 cannot be elected.
- Claim 41 recites “wherein a pair of said at least two CC-layer structures are separated by the thin non-magnetic spacer layer, at least one of said at least two CC-layer structures is inserted within the at least one ferromagnetic layer of the pinned layer structure, the part of the CC-layer structures having a higher conductivity includes a ferromagnetic material.” Fig. 9 does not show this feature; therefore, claim 41 cannot be elected.
- Finally, claims 19-21, 23, 24, 26-29, 42, and 44-46 are elected for consideration.

Ex parte Quayle

4. This application is in condition for allowance except for the following formal matters:
- Non-elected claims 1, 3-18, 30-41, 43 should be cancelled.
- Prosecution on the merits is closed in accordance with the practice under *Ex parte Quayle*, 25 USPQ 74, 453 O.G. 213, (Comm'r Pat. 1935).

A shortened statutory period for reply to this action is set to expire **TWO MONTHS** from the mailing date of this letter.

Allowable Subject Matter

5. Claims 19-21, 23, 24, 26-29, 42, and 44-46 are allowed.

The following is an examiner's statement of reasons for allowance:

- With regard to independent claim 21; as the closest reference of record, Sakakima et al (US 5,715,121) discloses a CPP spin-valve element formed on a substrate including: free layer structure including at least one ferromagnetic layer; a pinned layer structure including at least one ferromagnetic layer, the free layer is magnetically softer than the pinned layer; and a first

thin non-magnetic current confining (CC)-layer structure configured to separate the free and pinned layers, to prevent a substantial magnetic coupling between said free and pinned layer structures, and to allow an electric current to go through the confined current paths; and a second CC-layer structure placed across at least one of the free layer and the pinned layer; wherein conducting parts of said CC-layers are located in a cascade manner; **but fails to show** that at least an a majority of the nearest inner edge to edge distances of a projection of the conducting parts of the CC-layers forming of the current paths through said free layer structure or said pinned layer onto the layer plane are made greater than the thickness of at least one of said free layer structure and said pinned layer.

- With regard to claims 19 and 28; as the closest reference of record, Sakakima et al (US 5,715,121) discloses a CPP spin-valve element formed on a substrate including: a free layer structure including at least one ferromagnetic layer; and a pinned layer structure including at least one ferromagnetic layer, the free layer is magnetically softer than the pinned layer; wherein at least one CC-layer structure is incorporated therein, which is configured to separate the free and pinned layers and to allow an electric current to go through the confined current paths; **but fails to show** that the width of at least one of the confined current paths of said at least one CC- layer structure is greater than $t^{3/2}$ where t is the thickness of at least one of said free layer structure and pinned layer measured in nano-meters.
- Applicant asserts; the present invention “is to provide a spin-valve element of a CPP structure that has a high resistance and which generates a high output signal with a low current” (Specification, p. 4).

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled “Comments on Statement of Reasons for Allowance.”

Art Unit: 2627

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tianjie Chen whose telephone number is 571-272-7570. The examiner can normally be reached on 8:00-4:30, Mon-Fri.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hoa Nguyen can be reached on 571-272-7579. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Tianjie Chen/
Primary Examiner, Art Unit 2627